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A Survey of the Herpetofauna at Four Sites in the Western Colorado Desert

1980

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INTRODUCTION

The magic gecko (Coleonyx magicus) has attracted considerable interest since its discovery in the Colorado Desert of southern California in 1976. This study was initiated to obtain information on the abundance and distribution of the magic gecko and to obtain supplemental data on the herpetofauna within the range of the magic gecko.

The region of known captures of this State-listed "rare" lizard in California was presented by Fritts (1979). This report indicated that the animal's distribution probably followed the peninsular ranges and was restricted to the boulder strewn regions on the lower eastern slopes. This distribution is shared by many reptiles, and generally their range is limited on the north by the San Jacinto Mountains and on the east by the Santa Rosa Mountains. The magic gecko is generally restricted to the arid eastern slopes. Therefore, our study sites were placed within these confines except for the Mecca Hills site which was added as a possible eastern limit to the range.

Since Fritts (1978, 1979) reported that his greatest collecting success occurred in rocky areas on north-facing slopes, the three major study sites were located in such areas. Two sites were located in the Santa Rosa Mountains to detemine the lizard's northern distribution. These were placed at two different altitudes, one at 3500 feet and the other at 1500 feet, to provide sampling within different potential habitats. The third major site was placed adjacent to a known gecko collection site in Anza-Borrego Desert State Park in a habitat as closely matched to Fritts' (1979) description as possible.

MATERIALS AND METHODS

At each site, 40 5-gallon containers were buried flush with the ground and covered with a particle-board lid held about 10 cm above the substrate. When placement of 5-gallon containers proved too difficult, 1-gallon cans were substituted. The traps were placed at 10 m intervals on a 70 m X 40 m grid. With the exception of the Mecca Hills site, the grids were oriented 30 to 40 degrees east of north on a north-facing slope. This direction and slope was selected because of the collecting success of Fritts (1979) with this placement. In the Mecca Hills, this pattern had to be abandoned because the trap site was in a narrow wash. Here traps were set in two groups of 20 cans; the 10 m can spacing was maintained.

Traps were in place by the middle of April for the northern three trap sites but not until the end of June at the Yaqui Pass Site. Traps were checked every two weeks from April 11 to July 5, 1980.

Each individual trapped was identified, sexed, and weighed, and the snout-vent and total length measurements taken. Weights were obtained using a Pesola spring scale with either a 10 gm or 100 gm capacity depending on the size of the animal. These measurements were also recorded on subsequent recaptures. Because trap sites were checked at various times during the day and evening, body temperatures were not recorded. Lizards were marked by toeclipping, and snakes were notched on the ventral scales. Each individual was released 1 m east of the trap. All newly encountered species were photographed as were any unusual specimens. Photographs of each study area were also taken.

When the Yaqui Pass site became active (June 14), night-driving of roads was employed. The roads most traveled (Fig. 1) were the Borrego Springs Road (S-3), Highway 78 to Split Mountain Road, Split Mountain Road to the termination of the pavement, lower S-2, and the Montezuma Grade from Borrego Springs to the top of the plateau. Also during this time, limited rock-turning was employed near the trap side.

Information on vegetational composition was obtained at three sites using line transects along three of the established north-south grid lines. At the Mecca Hills site the transect lines were placed in areas visually selected as having representative flora. For each transect, ground cover and uncovered substrate were recorded to the nearest decimeter.

When capture-recapture numbers were great enough, the site population was estimated using the Schnabel formula for estimating species population in multiple capture-recapture studies. The Schnabel formula is as follows:

$$N = \frac{\sum M_i N_i}{\sum X_i}$$

Where N is the estimated population level, M_i is the total number of marked indivduals in the population, N_i is the number of individuals observed, and X_i is the number of marked individuals recaptured.

SITE LOCATIONS

Following is a description of each site location. The sites are shown on Figure 2.

Pinyon Crest site - Palm Desert Quadrangle, 15 min. series; Section 36, northern 1/2; altitude = 3,500 feet; approximately 100 m east of Carrizo Road, 1/2 km north of Highway 74. This grid was oriented 30° east of north and located in a saddle. The depression of the saddle divided the grid in the middle of its long axis in an east-west direction. The slopes on each side of the depression rose about 60 feet with an angle of about 35°. Large boulder outcroppings occupied the northwest and northeast corners of the grid and

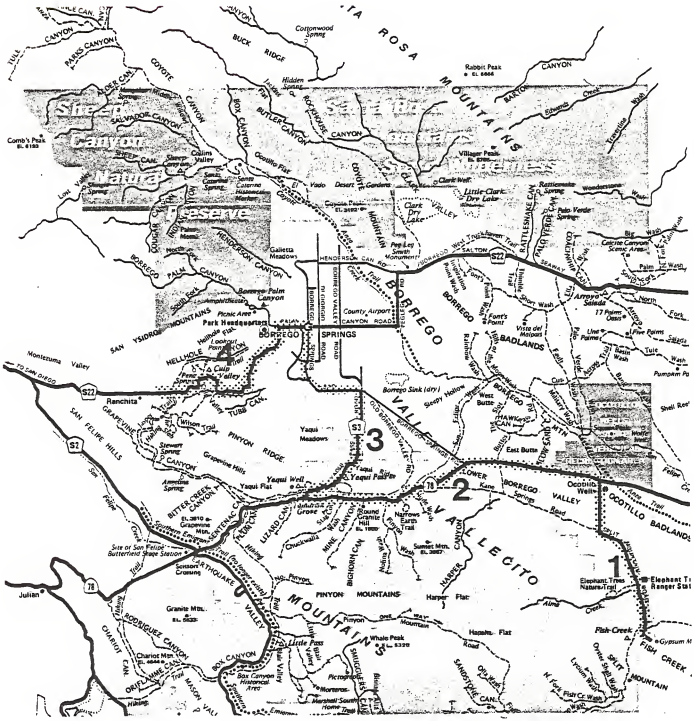


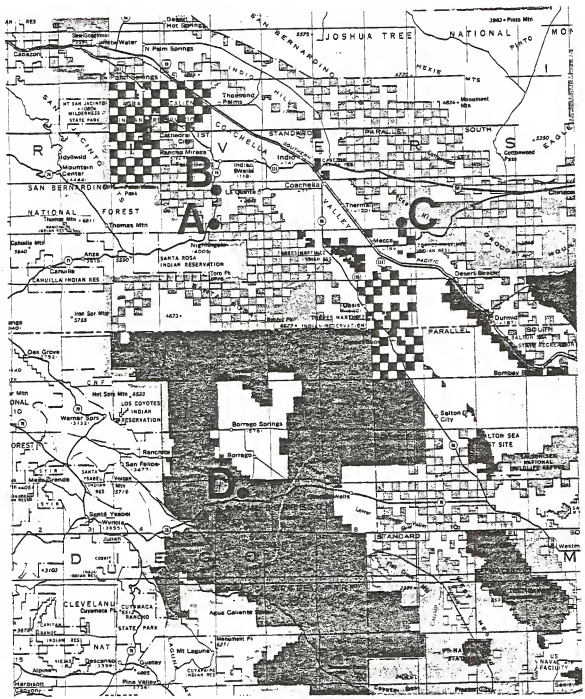
Figure 1. Roads traveled during night driving search for reptiles.

1—Split Mountain Road

2—Highway 78

3—Highway S-3

4—Montezuma Grade


A
B
C
D
JOSHUA TREE
NATIONAL
SAN BERNARDINO
NATIONAL
FOREST
SANTA ROSA
INDIAN RESERVATION
SAN JACINTO
WILDERNESS
STATE PARK
Palm Springs
Thousand
Palms
Indio
Coachella
Mecca
Thermal
Desert Beach
Durmid
Salton
City
Borrego Springs
Borrego
Ranchita
San Felipe
Santa Ysabel
Julian
Warner Springs
LOS COYOTES
INDIAN
RESERVATION
Ocotillo
Wells
Agua Caliente
Springs
Mt Laguna
Cleveland
National
Forest
Descanso
Pine Valley
Jacumba
Ocean
Side
Escondido
Valley
Center
Ramona
Julian
Idyllwild
Banning
Cabazon
Whitewater
Desert
Hot Springs
Indian
Wells
La Quinta
Indio
Hills
Chuckwalla
Mts
Orocopia
Mts
Salton
Sea
State
Recreation
Area
Imperial
Valley
Coachella
Canal
All American
Canal
Parallel
Standard
Parallel
Pinto
Mts
Cottonwood
Pass
Monument
Mts
Thomas Mtn
Toro Pk
Tahquitz
Peak
Santa Rosa
Mts
Santa
Rosa
Mts
Vallecito
Mts
Superstition
Mts
Fish
Creek
Mts
Coyote
Mts
Jacumba
Mts
Laguna
Mts
Cuyamaca
Peak
Cuyamaca
Rancho
State
Park
Lake
Cuyamaca
Lake
Henshaw
Lake
Elsinore
Lake
Cahuilla
Lake
Hemet
Reservoir
Lake
Perris
Reservoir
Lake
Skinner
Reservoir
Vail
Lake
Lake
Morena
Reservoir
Lake
Hodges
Reservoir
Lake
Wohlford
Reservoir
Lake
Henshaw
Reservoir
Lake
Cuyamaca
Reservoir
Lake
Elsinore
Reservoir
Lake
Cahuilla
Reservoir

were separated by a coarse-grain, sandy area. Smaller boulder regions were scattered throughout the grid, again separated by coarse sand. There were also isolated regions of finer sand, but it did not appear to be blow sand. Biotically, this site is an ecotone between desert and montane, with juniper (Juniperus californicus), catclaw acacia (Acacia greggii), desert apricot (Prunus fremontii), California buckwheat (Eriogonum fasciculatum), and brittlebush (Encelia farinosa) dominating. Pinyon Pines (Pinus monophylla) were not on the grid, but were numerous in adjacent areas.

Lower Highway 74 site - Palm Desert Quadrangle, 15 min. series; Section 7, southwest 1/4; altitude = 1,500 feet; 20 m northwest of Highway 74, approximately 1 km northwest of Lookout Point. The long axis of the grid was oriented 30° east of north on a slope of approximately 30 to 35°. The grid was divided into east and west halves by a shallow, sandy wash which originated at the southern end and gradually widened to about 10 m at the lower northern end. The site was very rocky with small boulders (0.5 to 1 m) found throughout the grid separated by areas of large rock, desert pavement, and rare sandy regions. Biotically, this site was typical Colorado Desert Cactus Shrub with desert agave (Agave deserti), beavertail cactus (Opuntia basilaris), cholla (O. sp), and brittlebush as the dominant plant forms.

Mecca Hills site - Mecca Quadrangle, 7.5 min. series; Section 35, northeast 1/4; altitude 400 feet; in a sandy wash north of the Painted Canyon Road. A northwest-oriented canyon was selected. This was a typical badlands, mud hills wash. The two grids at this site were situated mostly on the sandy floor of the wash though about ten traps were placed in the stabilized alluvium washed down from the steep walls of the canyon. The floor of the wash had a very gentle slope to the south. Plant life was very sparse and dominated by small annuals primarily in the genus Eriogonum, Hymenoclea and Coldenia. This site was not reactivated during the second half of the study.

Yaqui Pass site - Borrego Quadrangle, 15 min. series; Section 9, southern 1/2; altitude 1500 feet; approximately 200 m south of Borrego Springs Road (S-3); 1 km south of Yaqui Pass Campgrounds. The long axis of this grid was oriented 30° west of north and was placed on a north-facing slope with an angle of about 35 to 40°. The site was very rocky with numerous small boulders (0.5 to 1 m) separated by large particle size desert pavement. There was no loose surface sand though loose sand was present in the wash bordering the eastern margin of the grid. The slope was gentle at the lower northern end of the grid and became gradually steeper toward the south. Boulder outcrops partially bordered the southern, western, and southern end of the eastern margins of the grid, but none were present within it. Biotically, this area was cactus scrub with associated cholla, agave, and saltbush. The only variant to typical cactus scrub was the great abundance of Encelia which was the most common plant found. It was in this area that rock-turning and road-driving was employed to supplement can-trapping.

RESULTS

A total of 464 reptiles were captured during the course of the study. These included representatives of 12 species of lizards and 12 species of snakes.

Pinyon Crest Site

The Pinyon Crest site yielded a total of 164 reptiles, 136 captured in the April to July collection period and 28 in the October to December phase (Tables 1, 2, and 3). The most common reptile encountered was the side-blotched lizard (Uta stansburiana) with 118 individuals collected. This represented 71.9% of the total collection.

The limited numbers of individuals captured and recaptured allowed population density estimates on only two species of lizards - the side-blotched lizard and the western whiptail (Cnemidophorus tigris). Utilizing data up through the June 28 collection, population estimates determined by the Schnabel method are 107 side-blotched lizards and 45 western whiptails for the study plot (.28 hectare). Due to a reduced collection period (July 4) and low collection numbers, data from later collection periods were not used.

Lower Highway 74 Site

Of the 78 individuals captured at the Lower Highway 74 site, only 14 were captured during the October to December collection period (Tables 4, 5, and 6). Again, the most numerous reptile (38) collected was the side-blotched lizard. The western whiptail was also found in comparatively large numbers with 21 individuals, of which 15 were females. There were seven banded geckos (Coleonyx variegatus) two granite spiny lizards (Sceloporus orcutti), and one chuckwalla (Sauromalus obesus).

A comparatively large number of yucca night lizards (Xantusia vigilis) were also captured. Five were collected, and they were always found in traps located in or near decaying agave stands. The agave apparently provides a similar habitat to the Joshua tree woodland in this lizards more extensive range in the Mojave Desert.

Table 1 - Number, snout-vent (S-V) length, total length, and weight for males, females, and juveniles of eight species of reptiles captured at the Pinyon Crest Site from April to October 1980.

SPECIES	Sex	No.	S-V Length Ave. (range)	Total Length Ave. (range)	Weight Ave. (range)
Uta stansburiana (side-blotched lizard)	M	39	48.0(45-57)	126.0(89-148)	3.77(2.1-5.0)
	F	52	44.6(41-49)	114.7(77-149)	3.00(1.5-4.1)
	Juv.	2	40.5(38-43)	88.5(72-105)	1.7 (1.5-1.9)
Coleonyx variegatus (banded gecko)	M	1	63	119	3.6
	F	1	54	104	2.8
Cnemidophorus tigris (western whiptail)	M	4	81.0(75-85)	291.2(255-310)	15.3(11.1-22.5)
	F	12	81.2(70-91)	281.2(246-335)	15.9(8.5-27.0)
	Juv.	4	62.8(55-71)	193.2(122-253)	6.8(4.8-9.4)
Sceloporus orcutti (granite spiny lizard)	M	2	85 (78-92)	179.5(168-191)	25.3(20.5-30.1)
	F	7	90.1(85-100)	171.3(100-215)	32.3(21.5-39.0)
Xantusia henshawi (granite night lizard)	M	1	54	120	2.8
	F	2	57.5(57-58)	125.5(122-129)	3.2
	Juv.	2	38 (35-41)	91.8(85-98.5)	1.1(0.8-1.4)
Chionactis occipitalis (western shovel-nosed snake)	F	5	230.6(193-253)	278.4(239-303)	7.0(5.5-10.0)
Leptotyphlops humilis (western blind snake)	?	1	282	290	5.8
Phyllorhynchus decurtatus (spotted leaf-nosed snake)	F	1	157	233	9.5

Table 2. Number, snout-vent (S-V) length, total length, and weight for males, females, and juveniles of three species of reptiles captrued at the Pinyon Crest Site from October to December 1980.

SPECIES	Sex	No.	S-V Length Ave. (range)	Total Length Ave. (range)	Weight Ave. (range)
Uta stansburiana (side-blotched lizard)	M	6	40.2(36-46)	110.0(100-119)	1.9 (1.4-2.7)
	F	19	32.6(29-36)	89.4(65-106)	1.1 (0.6-1.9)
	Juv.				
Cnemidophorus tigris (western whiptail)	M				
	F	1	51	197	3.4
	Juv.				
Sceloporus occidentalis (granite spiny lizard)	M	1	102	135	29.4
	F				
	Juv.	1	36	86	1.6

Table 3. Numbers of reptiles captured and recaptured (lower number) at each trap date at the Pinyon Crest Site.

SPECIES	4/18	5/2	5/15	5/30	6/13	6/28	7/4	10/25	11/8	11/22	12/6	12/20	Total
Uta stansburiana	52	19	8	11	2	1	-	14	10	5	-	2	203
	-	18	12	19	10	6	3	1	4	5	-	1	
Coleonyx variegatus	-	-	-	1	-	-	1	-	-	-	-	-	2
	-	-	-	-	-	-	-	-	-	-	-	-	
Sceloporus orcutti	-	2	1	1	1	3	1	1	-	-	-	1	11
	-	-	-	-	-	-	-	-	-	-	-	-	
Cnemidophorus tigris	3	1	4	-	7	4	1	2	-	-	-	-	38
	-	1	1	5	4	2	2	-	1	-	-	-	
Xantusia henshawi	-	-	-	-	2	3	-	-	-	-	-	-	5
	-	-	-	-	-	-	-	-	-	-	-	-	
Chionactis occipitalis	-	-	-	1	2	2	-	-	-	-	-	-	5
	-	-	-	-	-	-	-	-	-	-	-	-	
Leptotyphlops humilis	-	-	-	-	1	-	-	-	-	-	-	-	1
	-	-	-	-	-	-	-	-	-	-	-	-	
Phyllorhynchus decurtatus	-	-	-	-	-	1	-	-	-	-	-	-	1
	-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL	55	41	26	38	29	22	8	18	15	10	0	4	

Table 4. Number, snout-vent (S-V) length, total length, and weight for males, females, and juveniles of nine species of reptiles captured at the Lower Highway 74 Site from April to October 1980.

SPECIES	Sex	No.	S-V Length Ave. (range)	Total Length Ave. (range)	Weight Ave. (range)
Uta stansburiana (side-blotched lizard)	M	11	48.1(45-51)	119.0(66-151)	3.5(2.8-4.1)
	F	11	45.5(44-49)	112.7(101-123)	3.1(2.0-4.1)
	Juv.	3	29.0(22-43)	61.3(27-102)	0.8(0.4-2.0)
Cnemidophorus tigris (western whiptail)	M	3	83.0(78-88)	263.7(236-288)	16.0(12.8-19.2)
	F	15	78.1(69-85)	252.1(182-319)	13.4(10.0-18.0)
	Juv.	2	60.5(58-63)	203.5(200-207)	4.2
Coleonyx variegatus (banded gecko)	M	3	55.0(45-60)	91.3(72-110)	2.3(1.5-3.1)
	F	4	63.3(60-72.5)	111.5(98-121)	5.1(3.4-6.4)
Sauromalus obesus (chuckwalla)	F	1	133	260	83.0
Xantusia vigilis (desert night lizard)	F	2	36(35-37)	82.5(78-87)	1.3(1.2-1.4)
		3	31.3(28-33)	72.7(64.81)	0.7(2.4-0.9)
Sceloporus orcutti (granite spiny lizard)	M	1	98	219	38.9
	F	1	88	154	33.6
Tantilla planiceps (western black-headed snake)	F	1	280	355	6.2
	Juv?	1	215	269	1.7
Phyllorhychus decurtatus (spotted leaf-nosed snake)	F	1	413	455	23.5
Leptotyphlops humilis (western blind snake)	?	1	248	255	2.5

Table 5. Number, snout-vent (S-V) length, total length, and weight for males, females, and juveniles of two species of reptiles captured at the Lower Highway 74 Site from October to December 1980.

SPECIES	Sex	No.	S-V Length Ave. (range)	Total Length Ave. (range)	Weight Ave. (range)
Uta stansburiana (side-blotched lizard)	M	3	47(45-48)	134(127-141)	3.0(2.1-3.9)
	F	5	42.6(38-47)	117.4(96-137)	2.7(2.0-3.6)
	Juv.	5	37.2(35-39)	104.4(90-111)	1.5(0.9-2.6)
Cnemidophorus tigris (western whiptail)	M				
	F				
	Juv.	1	48	181	2.0

Table 6. Numbers of reptiles captured and recaptured (lower number) at each trap date at the Lower Highway 74 Site.

SPECIES	4/18	5/2	5/15	5/30	6/13	6/27	10/25	11/8	11/22	12/6	12/20	Total
Uta stansburiana	18	3	-	2	2	3	4	3	3	4	2	77
	-	9	7	6	2	1	-	3	1	4	3	
Cnemidophorus tigris	4	7	6	1	4	1	1	-	-	-	-	44
	-	1	3	5	6	3	-	1	1	-	-	
Coleonyx variegatus	-	1	3	3	-	1	-	-	-	-	-	9
	-	-	-	-	-	1	-	-	-	-	-	
Sauromalus obesus	-	-	1	-	-	1	-	-	-	-	-	5
	-	-	-	1	1	1	-	-	-	-	-	
Sceloporus orcutti	-	1	-	1	-	-	-	-	-	-	-	2
	-	-	-	-	-	-	-	-	-	-	-	
Xantusia vigilis	-	1	1	2	1	1	-	-	-	-	-	6
	-	-	-	-	-	-	-	-	-	-	-	
Tantilla planiceps	-	1	1	-	-	-	-	-	-	-	-	3
	-	-	1	-	-	-	-	-	-	-	-	
Phyllorhynchus decurtatus	-	-	-	-	1	1	-	-	-	-	-	2
	-	-	-	-	-	-	-	-	-	-	-	
Leptotyphlops humilis	-	-	-	-	1	-	-	-	-	-	-	1
	-	-	-	-	-	-	-	-	-	-	-	
TOTAL	22	24	23	21	18	14	5	7	5	5	5	

Only four snakes were captured on the Lower Highway 74 site. However, two of these, the western black-headed snake (Tantilla planiceps) and the western blind snake (Leptotyphlops humulis), are relatively rare. The western black-headed snake was represented by two individuals, and the western blind snake by one. The western black-headed snakes were captured in three different traps. There was no common micro-habitat associated with trap location. One snake was captured on two successive collections. One trap was near a sandy, shallow wash, and the other was at the foot of a rocky ridge. The third site was in a gravelly area with scattered small boulders. The western blind snake was captured in a trap located in coarse sand near a decomposing, low, rocky outcrop. The fourth snake captured was a large, female spotted leaf-nosed snake (Phyllorhynchus decurtatus). This species is abundant and has a widespread distribution which closely follows the creosote bush belt in the Mojave and Colorado Deserts.

Population levels of 100 and 29 individuals, respectively, were estimated for the side-blotched lizard and the western whiptail for this 0.28 hectare area. Again, due to poor trap success in the second phase of the study, these estimated densities were determined using only data from the first phase.

Mecca Hills Site

The Mecca Hills site was closed down after the final June collection because it was felt that this site provided the least possibility for success in capturing a magic gecko and that time could be better spent searching more potentially productive habitats. However, earlier trapping in the Mecca Hills did result in the capture of 132 reptiles (Table 7 and 8).

The desert iguana (Dipsosaurus dorsalis) was by far the most abundant reptile. Fifty-nine individuals of this large herbivorous lizard were captured throughout the study site. Thirty-eight side-blotched lizards were also captured, but these were caught primarily in the traps on the steep, canyon walls. The 11 Chuckwallas collected were also predominantly found in these traps. Twelve banded geckos and six zebra-tailed lizards (Callisaurus draconoides) were found in traps on the floor of the wash which was composed chiefly of fine sand. Only three western whiptails were collected.

A total of three western blind snakes were found in two traps in habitat closely resembling that of the trap location of the blind snake captured at the Lower Highway 74 site. Although the composition of the substrate differed, the traps were located in sand near a low ridge of decomposing mud stone.

Table 7. Number, snout-vent (S-V) length, total length, and weight, for males, females, and juveniles of seven species of reptiles captured at the Mecca Hills Site.

SPECIES	Sex	No.	S-V Length Ave. (range)	Total Length Ave. (range)	Weight Ave. (range)
Dipsosaurus dorsalis (desert iguana)	M	17	110.9(90-130)	306.7(192-355)	43.4(19.4-59.0)
	F	18	105.1(83-120)	278.1(169-318)	37.2(13.9-51.4)
	Juv.	24	70.8(62-85)	200.9(87-259)	11.2(7.1-18.5)
Uta stansburiana (side-blotched lizard)	M	9	47.2(46-49)	126.1(113-137)	3.3(2.0-4.0)
	F	21	43.1(31-49)	103.1(47-136)	2.6(1.2-4.2)
	Juv.	8	26.5(21-32)	66.4(41-96)	0.6(0.2-1.2)
Coleonyx variegatus (banded gecko)	M	5	55.4(48-58)	89.0(71-103)	2.6(2.0-3.3)
	F	7	54.6(47-63)	98.6(63-118)	3.1(1.2-5.8)
Sauromalus obesus (chuckwalla)	M	2	155.0(135-175)	309.5(267-352)	100+(90.0-110+)
	F	3	154.3(132-183)	302.0(257-359)	110+
	Juv.	6	84.3(59-91)	173.5(144-187)	23.2(19.5-30.8)
Callisaurus draconoides (zebra-tailed lizard)	M	4	70.0(59-82)	153.3(139-166)	9.5(5.3-15.1)
	F	1	65	149	7.5
	Juv.	1	48	118	4.0
Cnemidophorus tigris (western whiptail)	M	1	80	311	11.7
	Juv.	2	51.5(40-63)	192.5(138-247)	4.1(1.2-6.9)
Leptotyphlops humilis (western blind snake)	?	3	206.0(194-222)	215.7(204-230)	1.9(1.3-2.8)

Table 8. Numbers of reptiles captured and recaptured (lower number) at each trap date at the Mecca Hills Site.

SPECIES	4/11	4/18	5/2	5/15	5/30	6/13	6/28	Total
Dipsosauris dorsalis	25	7	18	3	3	2	2	133
	-	5	14	23	14	5	5	
Callisauris draconoides	1	-	-	2	-	1	1	7
	-	-	-	-	1	1	-	
Cnemidophorus tigris	-	-	1	1	-	-	1	4
	-	-	-	-	-	1	-	
Coleonyx variegatus	1	2	3	2	1	2	-	12
	-	-	-	1	-	-	-	
Sauromalus obesus	1	-	-	5	1	1	3	13
	-	-	-	-	1	1	-	
Uta stansburiana	7	3	4	5	10	7	3	45
	-	-	2	1	1	2	-	
Leptotyphlops humilis	-	-	1	1	1	-	-	4
	-	-	-	1	-	-		
TOTAL	35	17	43	45	33	23	15	

Capture numbers were consistantly high throughout the study period (Table 8), and at least one individual of each species was recaptured. The desert iguana was by far the most frequently recaptured species with 23 marked individuals recaptured during one sample period (May 15). Recapture rates for the side-blotched lizard were surprisingly low compared with the other study sites.

Yaqui Pass Site

The Yaqui Pass site represented the most promising area for encountering the magic gecko. In addition to can-trapping within the study plot, road-riding, rock-turning, and night-walking were employed to increase the probability of locating specimens. This area has been the site of a single documented record of this species, and an additional specimen has been collected in the adjacent mountain region along Montezuma Grade Road (Fritts, 1978).

The Yaqui Pass site yielded 55 reptiles (Tables 9, 10, and 11). The side-blotched lizard accounted for 37 of these captures. Two other lizards, the banded gecko (7) and the western whiptail (6) were also captured here. The banded gecko was captured predominantly in the lower grid traps, whereas the whiptail was found throughout the study grid. A single desert horned lizard (Phrynosoma platyrhinos) was the only other lizard captured in the study area.

The western black-headed snake was collected twice, and the spotted night snake (Hypsiglena torquata) was represented by one individual. Recapture numbers are quite low (Table 11) because of the short study period. However, three different species were recaptured; these were the side-blotched lizard, the western whiptail, and the banded gecko.

Night-riding resulted in the capture of 31 reptiles - 28 snakes and 3 lizards (Table 12). The snakes represent eight species. The spotted leaf-nosed snake and the sidewinder (Crotalus cerastes) accounted for more than half of the snakes collected. Of these two species only the spotted leaf-nosed snake was found in Yaqui Pass. However, the western shovel-nosed snake (Chionactis occipitalis), the rosy boa (Lichanura trivirgata), the red diamond rattlesnake (Crotalus ruber), and the desert gophersnake (Pituophis melanolecus) were all found within 1 mile of the study area.

Rock-turning at or near the Yaqui Pass site yielded numerous side-blotched lizards (approx. 25), two banded geckos, one collared lizard (Crotophytus insularis), and one red diamond rattlesnake.

Table 9. Number, snout-vent (S-V) length, total length, and weight for males, females, and juveniles of six species of reptiles captured at the Yaqui Pass Site.

SPECIES	Sex	No.	S-V Length Ave. (range)	Total Length Ave. (range)	Weight Ave. (range)
Uta stansburiana (side-blotched lizard)	M	6	46.7(43-49)	111.8(60-142)	3.2 (3.0-3.5)
	F	8	45.8(45-49)	115.9(88-125)	2.7 (2.0-3.4)
	Juv.	3	22.7(22-23)	62.7(61-68)	0.3 (0.2-0.3)
Cnemidophorus tigris (western whiptail)	M	2	86.5(79-94)	315.5(294-337)	-
	F	4	82.0(76-89)	290.8(226-319)	15.0(9.5-22.5)
Coleonyx variegatus (banded gecko)	M	4	64.0(63-66)	104.5(88-120)	4.0(3.3-4.6)
	F	3	55.7(45-65)	89.0(69-110)	2.7(1.5-4.2)
Phrynosoma platyrhinos (desert horned lizard)	F	1	72	119	17.0
Tantilla planiceps (western black-headed snake)	F	1	270	336	4.0
	?	1	202	251	1.5
Hypsiglena torquata (night snake)	F	2	302.5(300-305)	360(359-361)	10.0(8.0-12.0)

Table 10. Number, snout-vent (S-V) length, total length, and weight for males, females, and juveniles of reptiles captured at the Yaqui Pass Site from October to December 1980.

SPECIES	Sex	No.	S-V Length Ave. (range)	Total Length Ave. (range)	Weight Ave. (range)
Uta stansburiana	M	9	42.8(39-44)	118.0(98-134)	2.2 (1.2-3.2)
(side-blotched lizard)	F	4	42.7(38-48)	118.5(110-130)	2.1 (1.8-2.7)
	Juv.	7	35.6(31-38)	97.3(76-115)	1.4 (0.9-2.0)

Table 11. Numbers of reptiles captured and recaptured (lower number) at each trap date at Yaqui Pass Site.

SPECIES	6/14*	6/28	7/5	11/8	11/22	12/6	12/20	Total
Uta stansburiana	3 –	10 2	4 1	10 –	6 2	2 –	1 1	42
Cnemidophorus tigris	– –	5 –	1 1	– –	– –	– –	– –	7
Coleonyx variegatus	1 –	6 –	– 1	– –	– –	– –	– –	8
Phrynosoma platyrhinos	– –	1 –	– –	– –	– –	– –	– –	1
Tantilla planiceps	– –	1 –	1 –	– –	– –	– –	– –	2
Hypsiglena torquata	– –	1 –	1 –	– –	– –	– –	– –	2
TOTAL	4	26	10	10	8	2	2	

* Only 20 traps in place at this date.

Table 12. Dates, species, and number of individuals collected in night-driving near the Yaqui Pass Site, 1980.

DATE	Species (number)
June 14	Pitnophis melanolencus (1)
	Arisona elegans (3)
	Coleonyx variegatus (1)
	Phyllorhynchus decurtatus (2)
	Urosaurus graciosus (1)
	Lichanura trivirgata (1)
	Crotalus ruber (1)
June 28	Phyllorhynchus decurtatus (2)
	Crotalus cerastes (1)
July 4	Coleonyx variegatus (1)
	Crotalus cerastes (1)
	Phyllorhynchus decurtatus (3)
	Chionactis occipitalis (1)
	Crotalus mitchelli (1)
October 25	Crotalus cerastes (4)
	Pitnuphis melanoleucus (1)
	Arizona elegans (1)
November 22	Lichanura trivirgata (2)
	Crotalus ruber (1)
	C. mitchelli (1)
	Pitnuphis melanoleucus (1)

A relatively small amount of time was spent night-walking through potential habitat because it was felt that night road-riding would cover more area and, therefore, increase the chance for success at capture of the magic gecko. All night-walking was done in the vicinity of the Yaqui Pass Campground and focused on more isolated rocky habitats which were dissected by paved roads. Although no specimens were obtained using this technique, emphasis should be placed on this method if future inventories are undertaken.

VEGETATIONAL ANALYSIS

Dominant plant species differed at each site (Table 13). However, substrate consisting of sand, gravel, rocks and/or boulders (diameter greater than 1.5 m) made up the majority of the transects.

The Pinyon Crest site is at the lower edge of the pinyon-juniper zone and along the eastern escarpment of the Santa Rosa Mountains. The dominant perennials were California buckwheat, desert apricot, and brittlebush. Annual grasses were also an important element of this floral community. Approximately 42% of the transect had plant cover composed of 20 different species (Table 13). This site had more large shrubs than the other three study sites.

The Lower Highway 74 site is typical Colorado Desert cactus-shrub, with high annual grass diversity due to unusually heavy spring rains. Desert agave, burrobush (Ambrosia dumosa), brittlebush, and cacti such as buckhorn cholla (Opuntia acanthocarpa), jumping cholla (O. bigelovii), and barrel cactus (Ferocactus acanthodes) were dominant species. However, ground cover estimates for cacti are misleading due to their clumped distribution and their failure to fall along transect lines by random chance. This area was particularly rich in plant life with 18 species making up the groundcover. Over half (51%) of the transect lines had plant cover making this study area the most densely covered of the four study sites. In addition to the plants listed, the ocotillo (Fouquieria splendens) was also widely scattered within the trapping grid.

The Mecca Hills site is a barren desert wash which supports a relatively short-lived group of annuals. Because of the paucity of plant life, transect lines were selectively laid out to include a representative sample of those plant forms present. The dominant plants at the time of the transect were Coldenia plicata, numerous small Eriogonum spp., annual grasses, and cheesebush (Hymenoclea salsola). Also present, though widely scattered, were creosote bush (Larrea tridentata) and indigo bush (Dalea schottii).

Table 13. Percent ground cover from plant transects at each of four study sites. (Totals do not equal to 100% because of rounding.)

COVER	Pinyon Crest Site	Lower Highway 74 Site	Mecca Hills Site	Yaqui Pass Site
Sand, Gravel, and Rock	35.8	20.8	73.5	51.5
Boulders	22.7	22.6	2.0	17.5
Eriogonum fasciculatum	7.5	0.7		1.2
Prunus fremontii	6.3			
Encelia farinosa	6.0	2.9		13.5
Acacia greggii	2.2			
Ephedra sp.	1.8	2.4		0.2
Juniperus californica	1.8			
Opuntia basilaris	0.6	0.1		
Yucca schidigera	0.9			
Salvia sp.	1.8			
Keckiella antirrhinoides	1.3			
Opuntia bigelovii	0.5	0.3		1.2
Dalea sp.	0.5			
Simmondsia chinensis	0.2			0.9
Quercus dumosa	0.5			
Annual Grasses	5.0	26.1	3.5	2.9
Bunch Grasses	0.6	2.7	0.5	
Unidentified A_1	0.6	1.6		
Unidentified A_2	1.8			
Unidentified A_3	0.2			
Unidentified A_4	0.3			
Agave deserti		8.4		3.4
Ferocactus acanthodes		0.1		
Ambrosia dumosa		3.8	1.6	2.6
Krameria grayi		0.9		0.1
Gutierrezia sp.		0.5		
Opuntia acanthocarpa		0.5		
Salazaria mexicana		1.0		
Hyptis emoryi		0.7		0.9
Sphaeralcea ambigua		0.8		
Eriogonum sp.			4.1	
Coldenia plicata			4.5	
Hoffmannseggia sp.			0.8	
Hymenoclea salsola			1.6	
Dalea schottii			0.1	
Euphorbia sp.			0.3	
Eremocarpus setigerus			0.1	
Mammillaria tetrancistra				0.01
Fagonia laevis				0.2
Fouquieria splendens				0.5
Larrea tridentata			1.9	1.0
Unidentified B_1		2.5		
Unidentified C_1			4.8	
Unidentified D_1				0.3
Unidentified D_2				0.7
Unidentified D_3				0.2
TOTAL	98.9	99.4	99.3	98.8

The Yaqui Pass site presented a typical rocky slope, Colorado Desert flora dominated by brittlebush, desert agave, burrobush, and ocotillo. This site had many areas with rocks, boulders, and desert pavement that were barren of any plant growth; only 31% of the transect lines had plant cover. Jumping cholla and creosote bush were also present, but were widely scattered.

DISCUSSION

A wide variety and a large number of reptiles was captured during the course of this study. Most species of lizards known to inhabitat the four study areas were encountered. The inventory of snakes was not as complete, although two species of relatively rare snakes (black-headed snake, blind snake), the shovel-nosed snake, and the spotted night snake were captured. Snakes generally encountered road-riding in these areas were not adequately sampled utilizing pitfall can-traps. Though can-traps have proven successful in the past for collecting magic geckos (Fritts 1979), none were obtained during this study. This may be due to low population levels, disjunct distribution, and/or highly secretive habits of this species.

Pinyon Crest Site

The Pinyon Crest site was selected because it was thought to represent the upper altitudinal limit of range distribution for the magic gecko, if this species follows distributions of other peninsular forms. The wide variety of micro-habitats presented and sampled within this area was thought to represent the range of possibilities this lizard might select.

This site did yield a large number of reptiles from a variety of micro-habitats. This site was expected to have the highest density and greatest diversity of reptiles because it was located in the ecotone between montane and desert communities. Density was the highest of all four sites, but diversity was not as high as expected. It may be that the Pinyon Crest site is not high enough for successful establishment of montane forms in this area even though some montone floristic elements are present. This hypothesis is supported by the fact that no purely montane reptiles were captured.

The lizards captured were typical of bouldered areas with the exception of the banded gecko. Only two of these lizards were captured. Therefore, considering the success found at other sites, these animals were probably present in very low numbers. This area and altitude is probably approaching the limits of their range.

Lower Highway 74 Site

The Lower Highway 74 site appeared to be an excellent area for reptiles, but the number of captures was surprisingly low. All of the reptiles captured were typical desert forms. The black-headed snake is rarely encountered road-riding, but two individuals were captured here with one recapture. The recaptured individual was caught at the opposite side of the grid approximately 30 m away from its original capture site. The other rare snake was the blind snake. This snake is also a secretive animal which is rarely encountered on roads. The blind snakes captured at all sites were found in very similar habitats with a sandy region very close to a vertical outcrop. The cracks in the vertical wall may well have served as a refuge during the day.

Mecca Hills Site

The reptiles collected at this trapping location were those associated with very arid habitats. A relatively large number of individuals were collected at this site, and the success of recapture indicates that a shaded can-trap works more efficiently in a relatively exposed habitat than in one offering a wealth of "hiding places." If this is true, then the survey of the reptiles at this site is probably more complete than that at other sites.

The most prevalent species captured at the Mecca Hills site was the desert iguana, representing about 45% of all captures. It was not found at any other trap site and replaced the side-blotched lizard as the most abundant species.

The three blind snakes captured and one recaptured were all caught in the same trap. This may indicate that their micro-habitat requirements are very restricted because, although can-traps are very effective for collecting blind snakes, only this one small area yielded any.

Yaqui Pass Site

Although the magic gecko has been recorded from the immediate vicinity of the Yaqui Pass site, none were found during this survey despite intensive searches. This demonstrates their rarity and the need for further study. Probably the best method to try to locate specimens in future studies would be night-walking along the rocky ridges with lanterns. Although this limits the amount of area that can be covered, it does allow for a more thorough examination of specific habitat and thus maximize the probability of capturing this elusive lizard.

Night road-riding in and around Yaqui Pass was very good. The 28 snakes in eight species and three lizards in two species represented a large percentage of the reptiles expected to be found employing this technique. Collection numbers were low at the beginning of the study because every other collection night coincided with the full moon when nocturnal reptile activity drops off sharply. Numbers of animals seen rose sharply during periods of little or no moonlight.

Rock-turning was centered on two areas - the Fish Creek Mountains (two occasions) and the boulder-strewn ridges adjacent to the study area. This was not an exhaustive search but done while waiting for the sun to set prior to road-riding. All the ridges within about 1/2 mile of the site were examined. This yielded many side-blotched lizards, two banded geckos, one collared lizard and one red rattlesnake.

During the course of the study, absolute numbers of reptiles collected rose to a peak in mid to late May and then declined. The Pinyon Crest site had a slight variation in this trend with a mid-April peak, then a drop in mid-May and then a rise again at the end of May. This mid-April high was due to extremely high numbers of side-blotched lizards and is not reflected in the numbers of other reptiles. The post-summer collections yielded very few animals, and the December 20th collection yielded only 11 animals from 120 traps. This decline paralleled a drop in the average temperature as winter started.

CONCLUSIONS

The purpose of this study was to gather data concerning the range, distribution, and habitat parameters of the magic gecko and at the same time survey the herpetofauna of four pre-selected sites in the peninsular range and adjacent hills. The failure to capture magic geckos further suggests their rarity and the need for even more extensive study. The means of sampling employed has proven successful in the past and coupled with more night-walking may prove successful in future studies. Only through improved knowledge of the species distribution and habitat preferences can it be protected from exploitation and possible extirpation.

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